Robert Allen Baker
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Winter Haven, FL 33885
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EDUCATION

M.S. (1967) Florida State University, Tallahassee, FL
Major: Plant Physiology Minor: Chemistry

B.S. (1964) Florida State University, Tallahassee, FL
Major: Biology Minors: Chemistry and math

PROFESSIONAL EXPERIENCE

1967-2001 U.S. Department of Agriculture, Agriculture Research Service, Citrus and Subtropical Products Laboratory, Winter Haven, FL

Research Leader, 1998-2001
Supervisory Research Chemist, 1989-1997
Research Chemist, 1968-1988
Physical Science Technician, 1967-1968

1963-1967 Florida State University, Biology Department, Tallahassee, FL

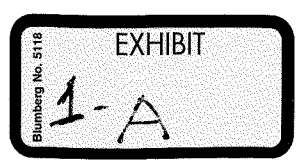
Research Assistant, 1965-1967
Teaching Assistant, 1964
Research Assistant, 1963

PROFESSIONAL AFFILIATIONS

American Chemical Society
Florida Section
Secretary/ Treasurer-elect, Lakeland Subsection, 1983
Registration and Finance Chairman, 37th Annual Meeting, 1984
Secretary/ Treasurer, Lakeland Subsection, 1985

Institute of Food Technologists
Associate Editor, 1989-2001
Citrus Products Division
Member Executive Committee, 1990
Chair-elect, 1992-1993
Chairman, 1993-1994
Chair, Selection Committee, 1994
Member, Citrus Short Course Committee, 1999-2001

Florida State Horticultural Society
Associate Editor, 1983-1989
Best Paper Selection Committee, 1979, 1981, 1987, 1988, 1992



PROFESSIONAL HONORS AND RECOGNITION

Best Paper Award, Handling and Processing Section, Florida State Hort. Society, 1968
Best Paper Award, Handling and Processing Section, Florida State Hort. Society, 1971
Invention Award for patent "Naphthoquinone antibiotics from *Fusarium solani*", 1989
Recognized as one of the most productive scientists in the South Atlantic Area, ARS, and awarded $2000 in Area Reserve Funds for research, 1989
IFT Research and Development Award, 1997

Mr. Baker was engaged in research at the USDA's Citrus and Subtropical Products Laboratory for a total of 34 years. During that time, he authored 3 patents and 81 publications, and gave over 60 oral presentations of his work at local, state, national, and international meetings. In recognition of his work, he was invited to participate in 9 Symposia at National ACS and IFT Meetings and at other International meetings. As Chair of the Citrus Products Division of IFT, he organized and conducted a symposium entitled "New Value-Added Products and By-Products". Mr. Baker served for 7 years as scientific editor for the Handling and Processing Section of the Florida State Horticultural Society, and for 10 years as Associate Editor for the Journal of Food Science.

Mr. Baker began his career at the Winter Haven laboratory working on citrus juice cloud. His earlier work showed that unpasteurized orange juice cloud could be partially stabilized with addition of certain enzymes, allowing production of cloud stable cold processed juice. Some citrus juices, such as lime, are sold as a clarified product, and lengthy settling times are necessary to achieve this clarification. Mr. Baker found that rapid clarification of fresh lime and other citrus juices could be effected with small quantities of polygalacturonic acid, a pectin derivative. Both of these processes were patented.

As natural juice pectins are attacked by pectin methylesterase (PME), they become predisposed to precipitation by calcium ions, causing juice clarification. By fractionation of low methoxyl pectins, Mr. Baker was able to ascertain the exact degree of methylation at which such pectins caused clarification. Further work with pectins partially demethylated with PME or with NaOH also showed the influence of random or selective demethylation on clarifying ability, and the effect of pH on the clarification phenomenon.

Mr. Baker demonstrated that with proper control of enzyme activity, vacuum infusion of citrus fruit with commercial pectinases could remove peel and produce firm, intact segments or whole peeled fruit. Such segments are a significant improvement over conventional cut sections, eliminating processing (cutting) waste, and yielding an attractive product firm enough to be presented in a dry package. Whole peeled fruit also represent a novel and appealing marketing opportunity, offering consumers the quality of fresh citrus in a more convenient form. A plant utilizing this technology has been built in Florida to produce peeled oranges and grapefruit, and other plants using this procedure are in operation in Japan, Israel, South Africa and the U.K. The USDA patent on this technology has also been licensed by several other companies in the U.S.

Mr. Baker, working in cooperation with a local citrus section producer, demonstrated that commercial cut grapefruit sections could be firmed by the addition of calcium salts to the cover liquid. Mr. Baker found that addition of calcium did not reverse seasonal decline of grapefruit sections, but imposed an incremental firmness that was independent of seasonal softening. This work suggested that, as had been found in calcium firmed pickles, calcium does not promote firming in grapefruit sections via the egg-box model. This work showed that gradual increases in calcium addition in response to periodic texture measurements allowed sections of consistent texture to be produced. The processor adopted Mr. Baker's method, and by seasonally adjusting calcium supplements, was able to produce Grade A sections much later in the season than in prior years.

Interest in dietary fiber has grown in recent years, and pectin (as a soluble fiber) could play a role in contributing to health. In a review of pectin functionality, Mr. Baker discovered that several widely published tables of pectin content in previous reviews were incorrectly derived from earlier work. These misstated data provided erroneous data on numerous foods, in many cases grossly inflating pectin contents. Mr. Baker carefully documented these errors in a critical review, and surveyed the literature for other more accurate pectin content values to supplant these incorrect data.

Publications

Baker, R. A. and Bruemmer, J. H. 1968. Oxidation of ascorbic acid by enzyme preparations from orange. Proc. Florida State Hort. Soc. 81: 269-275.

Baker, R. A. and Bruemmer, J. H. 1969. Cloud stability in the absence of various orange juice soluble components. Proc. Fla. State Hort. Soc. 82: 215-220.

Baker, R.A. 1971. Enzymic treatment of orange juice to increase cloud and yield, and decrease sinking pulp level. Proc. Fla. State Hort. Soc. 84:197-200.

Baker, R. A. and Bruemmer, J H. 1972. Pectinase stabilization of orange juice cloud. J. Agr. Food Chem. 20: 1169-1173.

Baker, R. A. and Bruemmer, J. H. 1972. Influence of pectate-hesperidin floc on orange juice clarification. Proc. Fla. State Hort. Soc. 85: 225-229.

Baker, R. A. and Bruemmer, J. H. 1973. Protease and pectinase additive to citrus juices. U. S. Patent No. 3,754,932. Granted August 28, 1973.

Baker, R.A. 1976. Clarification of citrus juices with polygalacturonic acid. J. Food Sci. 41: 1198-1200.

Bruemmer, J. H., Baker, R. A., and Roe, B. 1977. Enzymes affecting flavor and appearance of citrus products. ACS Symposium Series, No. 47, Enzymes in Food and Beverage Processing, p.1-11.

Baker, R. A. 1976. Clarification with low methoxyl pectins. Proc. Fla. State Hort. Soc. 89: 163-165.

Baker, R. A. 1977. Processes to control juice cloud. Proc. Int. Soc. Citriculture 3: 751-755.

Baker, R. A. 1979. Clarifying properties of pectin fractions separated by ester content. J. Agr. Food Chem. 27: 1387-1389.

Baker, R. A., and Bruemmer, J H. 1978. Clarification of citrus juices. U. S. Patent No. 4,101,678. Granted July 18, 1978.

Baker, R. A. 1979. Effect of pH on clarification of citrus juices by low methoxyl pectins. Proc. Fla. State Hort. Soc. 92: 156-159.

Baker, R. A. 1980. The role of pectin in citrus quality and nutrition. ACS Symposium Series, No. 143, 109-128.

Nemec, S., Baker, R. and Burnett, H. 1980. Pathogenicity of Fusarium solani to citrus roots and its possible role in blight etiology. Proc. Fla. State Hort. Soc. 93: 36-41.
Also appeared in Citrus Industry 62: 36-47 (1980).

Baker, R. A. Tatum, J. H., and Nemec, S., Jr. 1981. Toxin production by Fusarium solani from fibrous roots of blight-diseased citrus. Phytopathology 71: 951-954.

Baker, R. A. and Gaffney, K. M. 1981. Fusarium toxins for field testing. The Citrus Industry 62(11): 16-17.

Tatum, J. H. and Baker, R. A. 1983. Naphthoquinones produced by Fusarium solani isolated from citrus. Phytochemistry 22:543-547.

Crandall, P. G., Matthews, R. F., and Baker, R. A. 1983. Citrus beverage clouding agents--review and status. Food Technology 37(12): 106-109.

Baker, R. A. and Tatum, J. H. 1983. Naphthoquinone production by Fusarium solani from blighted citrus trees: quantity, incidence, and toxicity. Proc. Fla. State Hort. Soc. 96: 53-55.

Tatum, J. H., Baker, R. A. and Berry, R. E. 1985. Naphthoquinones produced by Fusarium oxysporum isolated from citrus. Phytochemistry 24: 457-459.

Tatum, J. H., Baker, R. A. and Berry, R. E. 1985. Three further naphthoquinones produced by Fusarium solani. Phytochemistry 24:3019-3021.

Coleman, R. L., Saunders, M. S. and Baker, R. A. 1985. Calcium determination in citrus pulp wash-- a comparison of a colorimetric procedure with atomic absorption spectrophotometry. Proc. Fla. State Hort. Soc. 98: 218-219.

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Tatum, J. H., Baker, R. A. and Berry, R. E. 1987. Naphthofurans isolated from Fusarium oxysporum isolated from citrus. Phytochemistry 26: 2499-2500.

Berry, R. E., Baker, R. A. and Tatum, J. H. 1984. Some phytotoxic effects of naphthoquinones produces by Fusarium solani from fibrous roots of blight-diseased citrus. Proc. Int. Soc. Citriculture 1984, Vol. 1.

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Berry, R. E., Baker, R. A. and Bruemmer, J. H. 1988. Enzyme separated sections; a new lightly processed citrus product. Proc. Int. Soc. Citriculture 6: 1711-1716.

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Baldwin, Elizabeth A. and Robert A. Baker. 1992. Natural Enzyme and Biocontrol Methods for Improving Fruits and Fruit Quality. In: Molecular Approaches to Improving Food Quality and Safety. Ed. by Bhatnagar, D., and T. E. Cleveland. Van Nostrand-Reinhold. pp. 61-82.

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Achor, D. S., Nemec, S. and Baker, R.A. 1993. Effects of Fusarium solani naphthazarin toxins on the cytology and ultrastructure of rough lemon seedlings. Mycopathologia 123: 117-126.

Baker, R. A., Baldwin, E. A. and Nisperos-Carriedo, M. O. 1994. Edible Films and Coatings for Processed Foods. In: Edible Films and Coatings to Improve Food Quality, J. Krochta, E. A. Baldwin and M. O. Nisperos-Carriedo (Eds.). Technomic Publishing Co. p. 89-104.

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Hagenmaier, R. H. and R. A. Baker. 1994. Citrus fruit with single or layered coatings compared with packinghouse-coated fruit. Proc. Fla. State Hort. Soc. 106: 238-240.

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Hagenmaier, R.D. and Baker, R.A. 1995. Internal gases, ethanol content and gloss of citrus fruit coated with polyethylene wax, carnauba wax, shellac or resin at different application levels. Proc. Fla. State Hort. Soc. 107: 261-265.

Baker. R.A. 1994. Enzyme peeled citrus fruit. 1994 Fla State Hort. Soc. Book of Abstracts, p. 88.

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Baker, R. A. and Grohmann, K. 1994. Use of enzymes in citrus processing. In: Citrus processing- adapting to change. Proceedings, 1994 Food Industry Short Course, Gainesville, FL., p. 63-68.

Baker, R. A. and Grohmann, K. 1995. Enzyme applications in citrus processing. Fruit Processing 5: 332-335.

Sreenath, H.K., Crandall, P.G. and Baker, R.A. 1995. Utilization of Citrus By-Products and Wastes as Beverage Clouding Agents. J. Fermentation and Bioengineering 80(2): 190-194.

Baker, R.A., Berry, N. and Hui, Y.H. 1995. Fruit Preserves and Jams. Ch. 5 In: Processing Fruits and Vegetables, Vol. I: Fruits: Biology, Principles and Applications. Technomic Publishing Co. p. 117-133.

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Hagenmaier, R. D. and Baker, R. A. 1996. Edible coatings from candelilla wax microemulsions. Journal of Food Science 61: 562-565.

Hagenmaier, R. D. and Baker, R. A. 1996. Edible coatings from morpholine-free wax microemulsions. J. Ag. Food Chem. 45:349-352.

Baker, R.A. 1996. Reassessment of some fruit and vegetable pectin levels. J. Food Sci. 62: 225-229.

Baker, R.A. and Hagenmaier. R.D. 1997. Reduction of fluid loss from grapefruit segments with wax microemulsion coatings. J. Food Sci. 62: 789-792.

Baker, R.A. and Wicker, L. 1996. Current and potential applications of enzyme infusion in the food industry. Trends in Food Science and Technology 7:279-284.

Cameron, R. G., Baker, R. A. and Grohmann, K. 1996. Citrus fruit tissue extracts affect juice cloud stability. J. Food Sci. 62:242-245.

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